RESULTS OF OPERATIONS ON THE KIDNEY FOR TUBERCULOSIS.

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FROM various sources the author has collected 194 cases in which some operation on the kidney was done for tuberculosis. To these may be added those in Bangs's table (ANNALS OF SURGERY, 1898, Vol. xxvii) and also those in Facklam's (Die wegen Nierenphthisie vorgenommenen Nephrotomien, etc., *Archiv für klinische Chirurgie,* 1893, Vol. xlv, p. 715), making 415 cases in all. We are at once struck with the small number of cures. Thus, in the author's list there are but forty-one out of 194 in which at the end of two years or more the patient was still well; in Bangs's list there were but ten in 135; and in Facklam's there were but seven in eighty-eight. Reduced to percentages, these cures are 21 per cent., 7.4 per cent., and 7.9 per cent., respectively. It is encouraging to observe that the later statistics are the most favorable. This is due to the fact that the operative cases have been, within recent years, more carefully selected as to fitness for operation, and that, with improved methods of arriving at a correct diagnosis, the patients have been operated upon early in the course of the disease. In most of the early cases cited, the diagnosis was arrived at from focal symptoms rather than from finding bacilli or from cystoscopic aid.

These results are disappointing. The reason they are not better is because renal tuberculosis is rarely primary in the kidney, there being a primary focus elsewhere in the body from which the renal tuberculosis takes its origin, and which may and does in many instances cause subsequent death, even if the urinary tuberculosis has been eradicated by surgical means. In twenty-four cases of caseous tuberculosis of the kidney occurring in 3424 autopsies at the Boston City Hospital and in the Massachusetts General Hospital during the past ten years, the kidney was never the only tuberculous organ in the body. In one of the twenty-four cases the primary focus of the disease was a tuberculous retroperitoneal lymph gland, and in another case it was a mediastinal lymph gland. Obsolete tuberculosis of the lung was present in two other instances, and served as a focus for the disease in the kidney. The cases of primary glandular tuberculosis must be explained as the result of their filtering the germs either swallowed or inspired. The distribution of the various foci of tuberculosis, sometimes alone and sometimes together, in the other cases was as follows: Lungs thirteen times, pleuræ twice, intestines six times, mediastinal glands eight times, retroperitoneal glands three times, larynx once, Fallopian tubes once, uterus once, prostate once, spinal column once, abdominal cavity once, liver once. In addition to these foci, miliary tuberculosis was found thirty times in various organs. It was, of course, impossible to determine how old these foci were; and it may be argued that they may have been secondary to a primary focus in the kidney. There is no means of proving that this is not so, and the question will probably never be satisfactorily answered. It could be answered only by autopsies in early cases of renal tuberculosis, and as the disease is rare it is probable that many years must elapse before the ultimate solution of the question.

Morris ("Surgical Diseases of the Kidney and Ureter," London, 1901, Vol. i, p. 484) is quite in accord with these findings, and he says that occasionally the kidney is found at autopsy to be the only organ actively diseased, but that old foci of cured tuberculosis are always found in the prostate, testicle, or lungs. He gives fifteen cases of caseous renal disease in 2610 autopsies occurring at the Middlesex Hospital.

When we consider the greater facility for infection that is presented to organs in more direct communication with the air, we may safely conclude that the primary focus of the disease is rather in these organs (lungs, intestines, etc.) than in the kidney, which from its situation is less exposed in this way.

Of the 415 cases analyzed by the author there were 122 deaths, immediate and remote, and of these deaths tuberculosis in some other organ was the cause in forty-nine instances; the remaining deaths were due to some other cause or were included in the operative mortality. Tuberculosis of the opposite kidney was reported in twenty-four cases (5.7 per cent.). The lungs were most frequently affected, and undoubtedly was the starting-point of the disease in many instances. Unquestionably, tuberculosis elsewhere in the body existed many more times than was reported. This was through omission to report the condition or through inability to recognize latent tuberculosis, such as occurs in mediastinal or retroperitoneal glands. That these latent foci may cause a further outbreak is a matter of record. After two of the nephrectomies, death occurred in one instance seven years after the operation from tuberculosis of the opposite kidney, and in the other eight years after the operation from general tuberculosis. On the other hand, there were some brilliant cures, the most remarkable of which was one of Czerny's cases (No. 62), in which cure had persisted for twenty-one years after the operation without there being any tubercular manifestation in the meantime. But such cases are exceedingly rare, and a patient who has been operated upon for renal tuberculosis should never consider that the future is safe. The corollary of this is that patients should take the utmost care of themselves in order to maintain their constitutions up to the highest possible pitch of vigor, for by this means only may they hope to keep in check the disease which is lurking somewhere within them.

The comparison between nephrectomy and nephrotomy is a striking one. As the author's statistics of 194 cases are the most recent ones, they alone may be referred to in comparing these operations. The difference in mortality is very marked,—17.4 per cent. in nephrectomy and 46.6 per cent. in nephrotomy. This result was perhaps due to the low condition of the patient at the time of the operation. Many of the patients were allowed to drag along in a septic condition for months before the operation, which had then become an operation of urgency. We cannot, therefore, draw any just conclusions from the cases taken as a whole. One operator seems to have made it his purpose to study the effect of nephrotomy. Reference is made to Czerny's cases, reported by Simon (*Beiträge zur klinischen Chirurgie,* Tübingen, 1901, p. 40. See Cases 37 to 68). He had only seven cases in which nephrotomy was the only operation performed. In all the other cases, to the number of fifteen, in which nephrotomy was the primary operation, a secondary nephrectomy was necessitated later, on account generally of persistent fistula combined with the low condition of the patient. Of the seven cases of nephrotomy, in only two were there permanent cures (Nos. 61 and 62), one still alive and well at the end of five years, and the other well at the end of four years. The remaining cases were either dead or not improved. There were four permanent cures, from two to nine years in duration. This seems like a large showing, but it must be remembered that the nephrotomies followed by nephrectomies should be added to the nephrotomies alone. If we do this, the percentage of absolute cures two years after the operation of nephrotomy is but .56 per cent.

The reason why the operation fails is because fistula results. A condition of sepsis is thus produced, and with it is the added danger of there being present a tubercular focus, which may be the source of origin of tuberculosis elsewhere in the body. It may safely be asserted that nephrotomy alone will offer but a slight chance of permanent cure.

But in nephrotomy followed by nephrectomy, we have an operation which offers the greatest encouragement. In forty-seven such cases there were but five deaths, a mortality of only 11.9 per cent., much better than in the case of nephrectomy alone, which gave a mortality of 17.4 per cent. More striking yet is the number of permanent undoubted cures; they are twelve in number, ranging in duration from two to twelve years. As compared with permanent cures after nephrectomy alone, the percentage is 25.4 and 13.8 in favor of nephrotomy followed by nephrectomy. Too much stress must not be placed upon these figures, however, and they are not offered as a claim that this procedure should be adopted in all cases. It is probable that the cases were those in which there was a large abscess which was drained; the patient was then allowed to recuperate until the general condition warranted the nephrectomy.

The mortality after nephrectomy, 17.4 per cent., is the best on record, Bangs's being 21.7 per cent., and Facklam's being 26 per cent. Undoubtedly this will be improved upon as time goes on.

Among the 415 cases there were six cases in which resection of the kidney was done. There was no operative mortality. In one case the patient was losing ground at the end of a year; in another the patient was well three years later; in the third the time was not stated. Of the other three cases, one occurred in Bangs's list, and was well at the end of a year; the other two were in Facklam's list, and one of them was well at the end of eleven months, and the other died four months after the operation.

This seems like a favorable showing, but, nevertheless, the operation is one which involves risk as to subsequent disease. Albarran (*Annales des Maladies des Organes Génito-Urinaires,* 1899, Vol. xvii, p. 358) condemns it, claiming that the tissue apparently not affected by the disease is not healthy tissue, as proved by the non-permeability of methylene blue through it. König and Pels-Leusden (*Deutsche Zeitschrift für Chirurgie,* 1900, Vol. lv, p. 35) also condemn it, basing their opinion upon a pathological study of sixteen kidneys. In not one of these kidneys was the renal parenchyma such as to have warranted a resection; the renal pelves particularly were diseased.

Ureterectomy, partial and total, with nephrectomy is an operation which deserves great attention. It is the ideal ope ation because it removes the whole focus of disease, save t in the bladder, and theoretically it ought to offer the most favorable chance for cure.

Taking up first the total ureterectomies in the 415 cases, we find sixteen cases with but a single death. The final results are most excellent. Of the sixteen cases, three have survived two years or more, and all the rest were doing well at the time of the report except one, which was improved only. Of the partial resections of the ureter with nephrectomy, there were ten, with no mortality. One of these died later, three were improved; in three the duration was not given, but they were doing well, and in the other three progress was satisfactory.

Of the cases in which the ureter was known to be diseased and was left *in situ* there were thirty-six. Analyzed, these cases were as follows:

Total number	36	
Operative recoveries	25	
Operative deaths	11	
Percentage of operative deaths	30 per cent.	
Operative deaths		11
Pulmonary phthisis	3	
Tuberculosis opposite kidney	2	
Cause not stated	2	
Uræmia	1	
Exhaustion	1	
Anuria	2	
	11	

Deaths later			7
One year or under		6	
Tubercular meningitis	1		
Tuberculosis opposite kidney	2		
Pulmonary phthisis	2		
Cause not stated	1		
Seven years		1	
Tuberculosis opposite kidney	1		
		7	

Improved	5
(Duration, a few months to five years. Persistent pyuria.)	
Recoveries. Duration not given	5
One year or under	2
Two years	3
Four years	3
	36

We note that complete recovery may take place even if the ureter has been abandoned. On the other hand, the mortality is quite large, 50 per cent., the deaths being either immediate, 30 per cent., or remote, 20 per cent. The cause of death in almost all the cases was tuberculosis in some form, suggesting at least that the tuberculous ureter might have been the infecting focus. In one case such a result took place after a lapse of seven years. Among the ill results following the abandonment of the ureter are fistula, secondary abscess if the ureteral stump is buried, continuance and persistence of urinary symptoms.

McCosh (ANNALS OF SURGERY, 1899, Vol. xxix, p. 757) reports the case of a man, nephrectomized three years previously, in whom a secondary abscess developed at the site of the ureteral stump. In another of his cases a secondary ureterectomy was required after nephrectomy, the ureter having become enlarged by collection of pus within it. Kelly and others have had similar experiences. It is known, however, that a tuberculous ureter, if the kidney has been removed, will sometimes atrophy. Brown (ANNALS OF SURGERY, 1899, Vol. xxix, p. 757) relates the case of a boy in whom the ureter, enlarged by the tuberculous changes, atrophied and became diminished one-fifth in size after nephrectomy, but the boy died seven months later of tubercular meningitis, and at the autopsy tubercle bacilli were found in the ureter.

To sum up, therefore, it appears that if the ureter is abandoned, further complication may be expected, and the most to be dreaded is death from tuberculosis in some other part of the body. The excellent results obtained by total and partial ureterectomy encourage the belief that it will be done more frequently in the future. It is probable that these cases were for the most part, at least, in individuals who were in a fair state of health at the time of the operation, otherwise the operative mortality must have been higher. It seems proper to insist that nephro-ureterectomy should be done in all cases in which the condition of the patient warrants it. The added risk is very slight. If the patient's condition does not seem such that its performance should be immediately undertaken, the operation should be left until a future time. As to the choice of route, lumbar or abdominal, it is too early to formulate rules. The lumbar route is easy, there is plenty of room, and the dangers are slight in an uncomplicated case. Hæmorrhage from the high vaginal arteries in the female should be guarded against if the operation is terminated through the vagina. The abdominal route is easier of performance, but there should be more danger from septic complications.

COMPARISON OF RESULTS.	Garceau's List.	Bangs's List.	Facklam's List.
Nephrectomies	101	84	72

	G.	B.	F.
Operative recoveries	86	69	57
Operative deaths	15	15	15
Percentage of operative deaths	17·4	21·7	26
Deaths later	12	6	7
No improvement	1	1	0
Improved	10	15	7
Recoveries (duration not given)	32	9	23
One year or under	17	28	13
Two years	4	7	3
Three years	2	1	2
Four years	3	1	2
Five years	1	0	0
Six years	0	0	0
Seven years	1	0	0
Eight years	1	1	0
Nine years	0	0	0
Ten years	0	0	0
Eleven years	1	0	0
Twenty-one years	1	0	0
	86	69	57

COMPARISON OF RESULTS.				Garceau's List.	Bangs's List.	Facklam's List.
Nephrotomies				22	20	0
	G.	B.	F.			
Operative recoveries	15	14	0			
Operative deaths	7	6	0			
Percentage of operative deaths	46.6	42	0			
Deaths later	4	5	0			
No improvement	0	0	0			
Improved	1	1	0			
Recoveries (duration not stated)	3	3	0			
One year or under	2	3	0			
Two years	1	1	0			
Three years	0	0	0			
Four years	3	0	0			
Five years	0	1	0			
Six years	0	0	0			
Seven years	0	0	0			
Eight years	0	0	0			
Nine years	1	0	0			
	15	14	0			

COMPARISON OF RESULTS.				Garceau's List.	Bangs's List.	Facklam's List.
Nephrotomies followed by nephrectomies				47	25	12
	G.	B.	F.			
Operative recoveries	42	19	8			
Operative deaths	5	6	4			
Percentage of operative deaths	11.9	31	50			
Deaths later	8	3	1			
No improvement	0	1	0			
Improved	8	1	0			
Recoveries (duration not stated)	8	6	5			
One year or under	6	5	2			
Two years	3	0	0			
Three years	1	2	0			
Four years	2	1	0			
Five years	1	0	0			
Six years	3	0	0			
Seven years	0	0	0			
Eight years	0	0	0			
Nine years	0	0	0			
Ten years	0	0	0			
Eleven years	1	0	0			
Twelve years	1	0	0			
	42	19	8			

COMPARISON OF RESULTS.				Garceau's List.	Bangs's List.	Facklam's List.
Nephrectomies and total resection of the ureter. Abdominal method.				4	2	0
	G.	B.	F.			
Operative recoveries	4	2	0			
Operative deaths	0	0	0			
Percentage of operative deaths	0	0	0			
Deaths later	0	0	0			
No improvement	0	0	0			
Improved	0	0	0			
Recoveries (duration not given)	0	0	0			
One year or under	3	2	0			
Two years	0	0	0			
Three years	1	0	0			
	4	2	0			

COMPARISON OF RESULTS.				Garceau's List.	Bangs's List.	Facklam's List.
Lumbar nephrectomy and total resection of ureter. Lumbar method.				8	2	0
	G.	B.	F.			
Operative recoveries	7	2	0			
Operative deaths	1	0	0			
Percentage of operative deaths	14.2	0	0			
Deaths later	0	0	0			
No improvement	0	0	0			
Improved	1	1	0			
Recoveries (duration not given)	2	0	0			
One year or under	2	0	0			
Two years	1	0	0			
Three years	0	1	0			
Four years	1	0	0			
	7	2	0			

Comparison of Results.				Garceau's List.	Bangs's List.	Facklam's List.
Lumbar nephrectomy and partial resection of ureter				9	1	0
	G.	B.	F.			
Operative recoveries	9	1	0			
Operative deaths	0	0	0			
Percentage of operative deaths	0	0	0			
Deaths later	1	0	0			
No improvement	0	0	0			
Improved	3	0	0			
Recoveries (duration not given)	2	1	0			
One year or under	3	0	0			
	9	1	0			

Comparison of Results.				Garceau's List.	Bangs's List.	Facklam's List.
Resections				3	1	2
	G.	B.	F.			
Operative recoveries	3	1	2			
Operative deaths	0	0	0			
Percentage of operative deaths	0	0	0			
Deaths later	0	0	1			
No improvement	0	0	0			
Improved	1	0	0			
Recoveries (duration not given)	1	0	0			
One year or under	0	1	1			
Two years	0	0	0			
Three years	1	0	0			
	3	1	2			

GENERAL SUMMARY (all operations).

Total number of cases		415
Total number of deaths		122
Immediate deaths (within one month)	74	
Deaths later	48	
Immediate mortality	17.8 per cent.	
General mortality	29.4 per cent.	
Total number of survivals		293
Time not stated	95	
No improvement	3	
Improved only and still affected by the disease	49	
Recovered one year or under	88	
Recovered two years	20	
Recovered three years	11	
Recovered four years	13	
Recovered five years	3	
Recovered six years	3	
Recovered seven years	1	
Recovered eight years	2	
Recovered nine years	1	
Recovered eleven years	2	
Recovered twelve years	1	
Recovered twenty-one years	1	
	293	
Total number of cures two years or over		58
Percentage of total cures two years or over		14 per cent.
Total number of cases well from within a few months of the operation, and therefore promising cases, and also cases of survivals two years or more		241
Percentage of promising cases		58 per cent.

CONCLUSIONS.

(1) Tuberculosis is rarely, if ever, primary in the kidney, and the original focus is in some other organ in more direct contact with the external air in the majority of cases.

(2) The presence of a primary focus of disease in the body, even if the disease has been thoroughly eradicated from the urinary tract, makes the ultimate prognosis in these cases doubtful at least.

(3) Such foci may remain permanently quiescent, but they may also become excited to activity by a generally low condition of the system, or by causes unknown to us.

(4) Patients should be told of the danger as regards the future for them, and they should lead lives of the greatest regularity, with strict attention to hygiene. A change of climate is very beneficial in these cases.

(5) Reported cures of long duration occur, but they have been few.

(6) Nephro-ureterectomy should be done in all cases in which the ureter is diseased, and the patient's condition allows of it. The bladder should be subsequently treated if diseased.

(7) An abandoned tuberculous ureter is an especial source of danger on account of the great liability of subsequent tuberculosis.

(8) Nephrotomy alone should be rejected except as a preliminary to a later nephrectomy.

(9) Resection is not justifiable, for we can never be sure that the portion removed is the only portion diseased.